REMARKS/ARGUMENTS

This communication is in response to the Office Action of October 16, 2007. Accordingly, this response is accompanied by a request for a three-month extension of time along with the required fees.

Claim Amendments

Claim 36 has been amended to properly refer to the antecedent "user adjustable digital loudness normalization control signal". No other claims have been amended. No claims have been cancelled. No new claims have been added.

Claim Rejections – 35 USC § 103

In the Office Action, the Examiner rejected claims 1-40, 42, 43 and 45-58 under 35 USC 103 (a) as being unpatentable over U.S. 5,892,836 by Ishige (hereafter referred to as Ishige) in view of U.S. 6,104,822 by Melanson (hereafter referred to as Melanson). The Examiner also rejected claim 58 under 35 USC 103(a) as being unpatentable over Ishige in view of U.S. 4,947,432 by Topholm (hereafter referred to as Topholm).

Regarding claims 1, 13 and 33, the Examiner argued that Ishige discloses a method of generating an analog acoustic output signal from an acoustic input signal in accordance with a configurable input/output characteristic, the method comprising the steps of (a) converting the acoustic input signal into a digital acoustic input signal; (b) transforming the digital acoustic signal into one or more frequency domain input signals; and (c) detecting the magnitude of each of the one or more frequency domain input signals.

However, the Examiner conceded that Ishige does not explicitly disclose the steps of (d) receiving a user adjustable digital loudness normalization control signal from a user during operation for controlling the configuration of said input/output characteristic having an amount of compression for loudness normalization, the control signal being configured to be directly increased or decreased by the user for increasing or

decreasing the amount of compression during operation; (e) for each of the one or more frequency domain input signals, determining a gain value in response to the user adjustable digital loudness normalization control signal and the magnitude of the frequency domain input signal; (f) providing one or more frequency domain output signals by multiplying each of the frequency domain input signals by the corresponding gain value; (g) transforming the one or more frequency domain output signals into a digital acoustic output signal; and (h) converting the digital acoustic output signal into the analog acoustic output signal.

However, the Examiner argued that Melanson discloses a digital signal processor hearing aid with a program selector switch that is preferably manipulable by a user to allow the user to dynamically select which of the digital signal processing means to invoke in which listening environment. The Examiner further argued that in dealing with these environments, each of the processing means may implement such functions as compression, noise compensation, feedback cancellation etc.

The Examiner is of the opinion that applying this environmental selection switch to Ishige would allow the user to conveniently alter the characteristics of Ishige's hearing aid to further assist the user in various environments. The Examiner further argued that it would have been obvious to one of ordinary skill at the time of the invention to apply the adjustable features of Melanson to the hearing aid of Ishige.

In response, it is respectfully submitted that even if the adjustable features of Melanson were applied to the hearing aid of Ishige, such a hearing aid would not provide all of the features of claim 1. Specifically, claim 1 recites receiving a user adjustable digital loudness normalization control signal from a user during operation for controlling the configuration of an input/output characteristic having an amount of compression for loudness normalization. Claim 1 further recites that the control signal is configured to be directly increased or decreased by the user during operation for increasing or

decreasing the amount of compression. It is submitted that Ishige and Melanson, either alone or in combination, do not provide such a feature.

In particular, with respect to Melanson, the hearing aid allows a user to select between rehabilitation strategies by manipulating a selector switch. The rehabilitation strategies may implement different filter bank structures and compression strategies. Each rehabilitation strategy is implemented as a digital signal processing program on a programmable digital signal processor. However, while each of the rehabilitation strategies may implement different compression strategies, there is no obvious or clear relationship between the amount of compression implemented in each of the rehabilitation strategies and the switch selection.

Specifically, with Melanson's device, the user may select between different programs, which may implement different compression strategies. However, Melanson does not explicitly teach that the different compression strategies have different amounts of compression. Specifically, Melanson teaches that each new program may entirely change the number of bands, bandwidths, and structure of the filter bank, as well as performing additional functions such as noise suppression (See Col. 19, Ln. 29-32). In addition, even if the different compression strategies could implement different amounts of compression, Melanson does not provide the user with means for directly increasing or decreasing the amount of compression. One compression strategy may increase the amount of compression, one may decrease it and one may not change the amount of compression at all. Accordingly, the user would not know which compression strategy (or which equivalent switch setting) increases the compression and which compression strategy decreases the compression. Nor could they achieve a certain amount of compression in between the three compression strategies. Accordingly, Melanson does not teach a hearing aid where the amount of compression may be increased or decreased by increasing or decreasing the control signal.

In addition, for argument's sake, even if Melanson's device provides different compression strategies for each particular hearing aid program, these compression strategies are combined with a particular hearing aid program and each hearing aid program is designed to provide optimal results in a particular listening environment (see Melanson's abstract) and so the user would be restricted to the compression strategy used for the hearing aid program that corresponds to the user's current listening environment. Furthermore, even if the user found the compression strategy for another hearing aid program to be more beneficial, by selecting that other hearing aid program some parameter values may change based on the listening environment associated with the other hearing aid program which may have an overall detrimental effect on the performance of the hearing aid in the user's current listening environment. The Applicant submits that in both of these situations Melanson's device would not be helpful and the Applicant further notes that the Applicant's claimed device would not suffer from these limitations.

With respect to claim 13 of the subject application, the Applicant respectfully submits that the Examiner has failed to respond to the Applicant's comments put forth in the previous response. Specifically, claim 13 recites a plurality of user control signals in which each user control signal is similar to the user control signal claimed in claim 1. The multi-user control allows the user to adjust the control signals separately for each channel in a multi-channel amplification device. The Applicant submits that such a multi-control approach is more flexible than the selector switch taught by Melanson. Whereas in Melanson the user is limited to the small number of programs preset into the instrument, the claimed multi-control of the subject application allows the user to more flexibly set the compression, and hence to affect the gain, of each channel independently of the others and therefore allows for a much wider range or number of combinations of adjustment. The Applicant submits that Melanson does not teach the use of more than one control signal that can be adjusted by the user. The Applicant respectfully requests that the Examiner respond to the Applicant's arguments with respect to claim 13 or withdraw the rejection with respect to claim 13.

With respect to claim 33, a similar argument can be made as was made for claim 1.

Regarding claim 58, the Examiner argued that Ishige discloses a method of generating an analog acoustic output signal from an acoustic input signal in accordance with a configurable input/output characteristic, the method comprising the steps of (a) converting the acoustic input signal into a digital acoustic input signal; (b) transforming the digital acoustic input signal into one or more frequency domain input signals; and (c) detecting the magnitude of each of the one or more frequency domain input signals.

However, the Examiner conceded that Ishige does not explicitly disclose the steps of (d) receiving a user adjustable digital loudness normalization control signal from a user during operation for controlling the configuration of said input/output characteristic having an amount of compression for loudness normalization, the control signal being configured to provide the user with a continually variable control for increasing or decreasing the amount of compression during operation; (e) for each of the one or more frequency domain input signals, determining a gain value in response to the user adjustable digital loudness normalization control signal and the magnitude of the frequency domain input signal; (f) providing one or more frequency domain output signals by multiplying each of the frequency domain input signals by the corresponding gain value; (g) transforming the one or more frequency domain output signals into a digital acoustic output signal; and (h) converting the digital acoustic output signal into the analog acoustic output signal.

However, the Examiner argued that Topholm discloses a programmable hearing aid with a multifunction sliding switch. Specifically, the Examiner refers to sliders 12 of Topholm.

The Examiner is of the opinion that applying these sliding switches to Ishige would allow the user to conveniently alter the characteristics of Ishige to further assist the user in

various environments. The Examiner further argued that it would have been obvious to one of ordinary skill at the time of the invention to apply the adjustable features of Topholm to the hearing aid of Ishige.

In response, Applicant submits that Ishige and Topholm, neither alone nor in combination, teach all of the features of claim 58. Specifically, neither Ishige nor Topholm teach receiving a user adjustable digital loudness normalization control signal from a user during operation for controlling the configuration of said input/output characteristic having an amount of compression for loudness normalization, the control signal being configured to provide the user with a continually variable control for increasing or decreasing the amount of compression during operation, as recited in claim 58.

In particular, with Topholm, the sliders 12 that the Examiner refers to are not user adjustable. Specifically, it is stated at Col. 3, Ln. 11-18, "[t]hese adjustable slides are normally covered and not accessible to the user." Furthermore, it is clear from FIG. 3 that the sliders 12 form part of the programming device 5 and it is stated at Col. 3, Ln 53-55 that "... the programming device 5 ... is not accessible to the user." See also claim 3 for further support. The sliders of the Topholm reference are used by an acoustician to program the hearing aid (See Col. 3, Ln. 39-42). This is in stark contrast to the present application where the user, not the acoustician, is given the ability, via the user adjustable digital loudness normalization control signal, to directly and dynamically adjust the amount of compression during operation.

In addition, the sliders 12 of the Topholm reference are not used to dynamically alter the amount of compression during operation. When the external control unit is switched on the hearing air is programmed by a hearing acoustician. This involves setting the slide switches 12 to the required position. Once the programming is complete, the acoustician presses the program entry button. This causes the setting of the sliders 12 to be read by a decoder 18 and stored in the program memory 20 (See Col. 3, Ln. 39-

46). The contents of the program memory 20 are then transmitted to the hearing aid 9 via the transmitter 25. The hearing aid receiver 26 then transfers the received data into the program memory 31 of the hearing aid where it remains stored as long as the hearing aid is operating (See Col. 4, Ln. 30-36). Accordingly, the sliders 12 provide a means for initially programming the hearing aid, but are not used by the user to make dynamic adjustments to its operation. In fact, the Topholm hearing aid includes means for automatically (as opposed to manually as in the present application) adjusting the hearing aid settings. Specifically, the Topholm hearing aid includes a microphone and detector amplifier for determining the ambient or background noise level which can be used to automatically adjust the sound volume range, the compression, the output sound pressure and the overall transmission characteristic to match the relevant ambient conditions (See Col. 4, Ln. 47-66).

In contrast, the user control signal of claim 58 of the subject application allows the user to dynamically adjust the amount of compression during operation. This gives the user the freedom to adjust the loudness response to optimize the output of the device from the user's perspective.

Accordingly, the Applicant respectfully submits that claims 1, 13, 33 and 58 of the subject application are novel and inventive over the cited references and should be allowed. Further, for at least the reason that claims 2-12, 14-32, and 34-40, 42, 43, and 45-57 depend on one of claims 1, 13 or 33, the Applicant respectfully submits that these claims should also be allowed.

CONCLUSION

In view of the foregoing comments, it is respectfully submitted that the application is now in condition for allowance. If the Examiner has any further concerns regarding the language of the claims or the applicability of the cited references, the Examiner is respectfully requested to contact the undersigned at 416-957-1603.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,
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